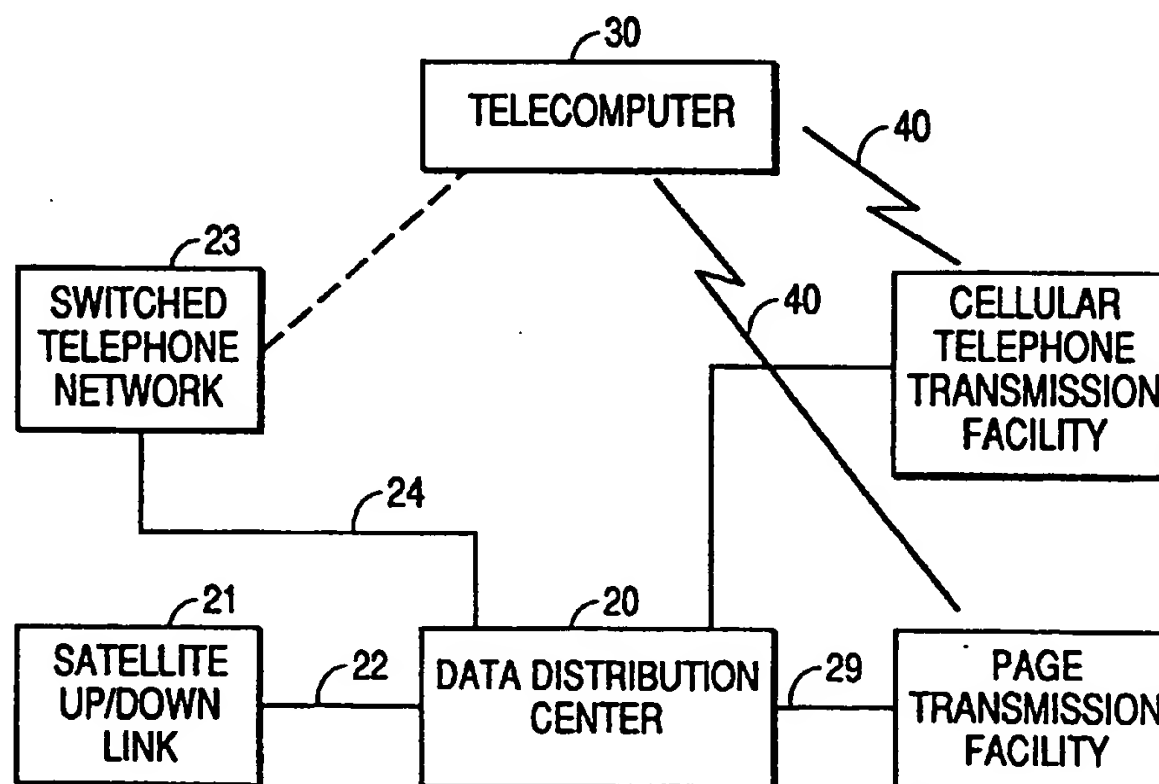




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(54) Title: MOBILE TELECOMMUNICATIONS SYSTEM



(57) Abstract

A telecommunications system which permits automatic unattended receipt of E-Mail, Facsimile, Telex, Telegrams, Voice Mail and Two-way communications. The system includes a portable telecomputer (30) which includes a CPU (12) interfacing a paging radio receiver system. Specially coded control signals relayed through the pager (8) by way of the microprocessor (12) activates the unpowered standby computer, Data Modem, Facsimile Modem, Wireline Modem and Cellular Telephone transceiver sections of the telecomputer (30). The data distribution center (20) upon receiving a pager induced looped call from the telecomputer's (30) internal cellular transceiver (9), automatically transfers back to the telecomputer's (30) storage device (11), and electronic data message such as E-Mail, File achieves, Group level-3 Facsimiles, Telex, Telegram or when attended, Voice Mail or Two-way voice calls.

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MOBILE TELECOMMUNICATIONS SYSTEM

BACKGROUND OF THE INVENTION

The present invention generally relates to the field of telecommunications and more particularly, is directed to a mobile telecomputing device which can automatically receive, transmit and relay telecommunications information and data.

SUMMARY OF THE INVENTION

The telecommunications system of the present invention makes it possible to cause the automatic unattended receipt of E-MAIL, facsimile, telex, telegrams, voice mail and two-way voice communications. The system includes a telecomputer device which is portable and operates from battery power or from an A/C power line when one is available.

The telecomputer has an electronic microprocessor circuit board that directly interfaces a numeric or alphanumeric paging radio receiver system having a port for downloading data and which is removable or non-removable from a portable computer that also internally contains a cellular telephone.

Specially coded control signals relayed through the pager by way of the interface microprocessor circuit board may be used to activate or turn on the electrically dormant or unpowered standby computer, data modem, facsimile modem, wireline modem, and cellular

telephone transceiver sections of the telecomputer, thereby making it possible through special function control programming to cause the cellular telephone to automatically dial a local or (800) national or international telephone number. This number's phone system is connected to a data distribution center that upon receiving the pager induced looped call from the portable telecomputer's internal cellular transceiver, automatically transfers back to the portable machine's computer data storage section, an electronic data message such as E-MAIL, file achieves, group level-3 facsimiles, telex, telegram or when attended, voice mail or two-way voice calls.

The information received by the telecomputer can be stored on an electromagnetic storage medium such as tape, drum, floppy disc, hard disk drive, optical laser disc or other retention medium. The information may also be stored in volatile or non-volatile memory elements. In addition, the telecomputer can also be programmed to verify for the central paging mainframe computer the receipt of a high priority numeric or alphanumeric pager message. The device then shuts off all other systems of the telecomputer except the paging function while alerting the user by appropriate external audible or visual signal as to what is occurring.

BRIEF DESCRIPTION OF THE DRAWINGS

Figure 1 is a block diagram illustrating the telecomputer device used in the present invention.

Figure 2 is a block diagram illustrating the overall construction of the mobile telecommunications system in accordance

with the present invention.

DESCRIPTION OF THE PREFERRED EMBODIMENT

Figure 1 is a block diagram illustrating the basic construction of the telecomputer which forms an integral part of the communications system of the present invention.

As Figure 1 shows, the telecomputer includes a number of interrelated elements such as RAM memory 1 and ROM memory 2 where instructions and temporary data storage areas of a computer program reside. The telecomputer also includes input/output (I/O) peripherals devices 3 which allow the system to communicate with the user and with the outside world through such devices as LCD screen 4, telephone modem 5, keyboard 6, printer 7, electronic pager 8 and cellular telephone 9. The telecomputer further includes mass storage devices 11 which allow the system to store data to and receive programming instructions from such peripheral devices as magnetic floppy disks, optical and tape units and CD-ROM storage devices.

The heart of the telecomputer is central processing unit (CPU) 12 which supervises the flow of information between the various elements of the telecomputer and which perform logic calculations and other functions based on instructions in the computer program stored in RAM 1 and/or ROM 2 and data associated with the program. CPU 12 may also integrally include RAM and/or ROM storage devices. A task scheduler 10 also is connected to CPU 12. As further described below, task scheduler 10 helps CPU 12 supervise the flow

of information between CPU 12 and other elements of the telecomputer of Applicants' invention.

CPU 12 uses the concept of "time sharing" wherein a number of computer programs, or routines within an overall program, reside in memory at the same time and seemingly run simultaneously. Some programs and routines may also reside in mass storage devices and be read into and out of memory when needed in an overlay fashion. Each program or routine is referred to as a task or job and though it may appear to the casual observer that the CPU is continuously devoting its full attention to the task being performed for the user. In actuality, each task receives only a fraction of the CPU's time before the CPU moves on to other tasks.

A facility known as an "interrupt" allows the execution of the CPU to be interrupted periodically based on requests for service from internal or external devices or based on the passage of a certain amount of time. When an interrupt occurs and depending on its priority with respect to other interrupts and the task currently being performed by the CPU, the CPU stores information about the task it was performing when the interrupt occurred and then executes another task determined by the nature of the interrupt. The stored information allows the CPU to resume execution of the task which was interrupted once it has finished performing the task required by the interrupt. The CPU may also execute other tasks required by other higher priority interrupts before returning to the original task.

Means must be provided for selecting the task which will be

executed by the CPU and means for deciding how long the CPU will execute the tasks before reassigning the CPU to another task. Task scheduler 10 performs this function. The operation of task scheduler 10 is itself supervised by CPU 12.

Tasks performed by CPU 12 can be divided into the following three categories based on the criticality or priority of the timeliness of the CPU's response to events related to the task:

1. "Real-time" tasks where the essence of the CPU function is to provide a rapid response to external events. An example of this type of task is the guidance control program for a missile. If the CPU is unable to provide a rapid response to course deviations or changing fuel weight, the missile will go off course.
2. "Interactive" task where a delay in response is inconvenient and inefficient but is not disastrous. An example of this type of task is a computer program which provides information about a customer's account status to a bank teller. If the computer is unable to provide a rapid response, the teller's time will be wasted and a waiting customer will be annoyed, but the bank will suffer no major adverse consequences.
3. "Background" tasks where response time to

external events is not important. An example of this type of task is a program to print bank accounts summary statement at the end of the month.

All of the above types of task exist in the telecomputer of Applicants' invention and are supervised by task scheduler 10.

With reference again to Figure 1, the telecomputer of Applicants' invention is powered by AC power 15 when available or by battery 16. Power may also be provide by solar power 17 which also can be used to maintained battery 16 in a charged state. The telecomputer also includes a satellite transmitter/receiver 14 for sending and receiving radio signals from a satellite as discussed below.

The elements illustrated in Figure 1 may be generally selected from among prior art devices known to those of ordinary skill in the art.

With reference to Figure 2, there is illustrated an overall block diagram of the mobile communications system of Applicants' invention. The system includes data distribution center 20 which receives communication information from various sources for processing and routing. The communication information may include, telegram and telex data, E-MAIL and voice mail message data, paging data, facsimile data and control signal information.

Data distribution center 20 may be formed of a main frame computer and include many of the elements illustrated in Figure 1 with respect to the telecomputer of Applicants' invention.

Data distribution center 20 is coupled to global satellite up/down link 21 by communication path 22. Up/down link 21 includes satellite transmission and receiving equipment for transmitting the communication information up to an orbiting satellite for relay to telecomputer 30 as shown in Figure 2. Up/down link 21 also includes satellite receiving equipment for receiving communication information from the satellite which originates from telecomputer 30. Up/down link 21 may also include signal processing and formatting equipment in order to maximize the efficiency of the transfer of the communications information between the satellite and data distribution center 20.

Data distribution center 20 also is coupled to commercial switched telephone network 23, cellular telephone transmission facility 26 and pager transmission facility 28 by communication paths 24, 27 and 29. Facilities 26 and 28 may be used to transfer the communication information between telecomputer 30 and data distribution center 20 using a radio signal 40. The communication information also may be transferred between telecomputer 30 and data distribution center 20 via switched telephone network 23.

Communication paths 22, 24, 27 and 29 may be a part of the commercial switched telephone network using wire or fiber optic conductors or may be formed of a microwave link as is known in the art.

In accordance with the present invention, specially coded control signals may be relayed from data distribution center 20 via pager transmission facility 28 to telecomputer 30 to activate or

turn on the electrically dormant or unpowered CPU 12, modem 5 for facsimile, data and voice telephone and cellular telephone 9 of telecomputer 30, thereby making it possible through special function control programming to cause cellular telephone 9 to automatically dial a local or (800) national or international telephone number. This number's phone system is connected to a data distribution center 20 from switched telephone network 23. Upon receiving the pager induced looped call from the telecomputer's internal cellular telephone 9, data distribution center 20 automatically transfers back to the telecomputer's data storage data storage section (mass storage devices 11, e.g.), any electronic data messages such as E-MAIL, file achieves, group level-3 facsimiles, telex, telegram or when attended, voice mail or two-way voice calls that are being held in data distribution center 20.

In addition, telecomputer 30 may also be programmed to verify for data distribution center 20 the receipt of a high priority numeric or alphanumeric pager message. Telecomputer 30 may then shuts off all other systems of the telecomputer except the paging function while alerting the user by appropriate external audible or visual signal as to what is occurring.

In accordance with the present invention, a user of telecomputer 30 may originate communication information in the form of a voice telephone signal, for example, for transmission through the system to a distant telephone. Such communication information is transferred to data distribution center 20 via switched

telephone network 23 using modem 5 shown in Figure 1 or via cellular telephone transmission facility 27 using cellular telephone 9 shown in Figure 1. The communication information includes distribution information which is used by data distribution center 20 to route the communication information to the recipient in the most efficient manner. In the case of a voice or facsimile telephone signal, the distribution information may be the destination telephone number. If the destination telephone number is connected to the switched telephone network 23, data distribution center 20 routes the communication information to the telephone network via communications path 24 for transfer to the destination telephone. Data distribution center 20 may hold the communication information for later transfer to the recipient.

If the communication information is destined for a second telecomputer device 30, data distribution center 20 consults a stored information file for information concerning the current geographical location of the second telecomputer 30 and routes the communication information accordingly.

If second telecomputer 30 is located a great distance from first telecomputer 30, the communication information maybe routed through up/down link 21 for transfer via satellite to satellite transmitter/receiver 14 shown in Figure 1. Telecomputer 30 also may use transmitter/receiver 14 to transmit the communications information directly to the satellite for down linking to up/down link 21 and transfer to data distribution center 20 for routing to the recipient.

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While the foregoing describes a preferred embodiment of the present invention, it is to be understood that the invention is not limited thereto. Various alternative embodiments will be readily apparent to one of ordinary skill in the art. The invention is only limited by the claims appended hereto.

CLAIMS

1. A system for receiving data and distributing said data to selected recipients, said system comprising:
 - data input means for entering said data;
 - distribution signal input means for entering a distribution signal;
 - distribution means for distributing said data in accordance with said distribution signal;
 - paging signal means for transmitting a paging signal to at least one recipient to indicate the presence of distributed data for said recipient; and
 - control means coupled to said data input means, said distribution signal input means, said distribution means and said paging signal means, wherein said control means controls the operation of said distribution means to distribute said data to selected locations in accordance with said distribution signal and controls the operation of said paging means to transmit said paging signal.
2. The system of claim 1, wherein said data input means is a touch-tone telephone.
3. The system of claim 1, wherein said data input means is a cellular telephone.
4. The system of claim 1, wherein said data input means is a facsimile machine.
5. The system of claim 1, wherein said data input means is

a digital computer.

6. The system of claim 1, wherein said data input means is an analogue computer.

7. The system of claim 1 further including output means for receiving said data distributed to said recipient.

8. The system of claim 7, wherein said output means is a telephone or full motion real time vision phone or picture phone.

9. The system of claim 7, wherein said output means is a cellular telephone.

10. The system of claim 7, wherein said output means is a facsimile machine.

11. The system of claim 7, wherein said output means is a digital computer.

12. The system of claim 7, wherein said output means is an analogue computer.

13. The system of claim 7, wherein said output means is an alphanumeric paging receiver.

14. The system of claim 4, wherein said output means is a facsimile machine.

15. The system of claim 5, wherein said output means is a facsimile machine.

16. The system of claim 1 further including recipient input means for receiving a recipient control signal from said recipient.

17. The system of claim 1, wherein said control means controls the operation of said distribution means to distribute said data only after said recipient control signal is received.

18. The system of claim 17 wherein said recipient's control signal includes a destination signal, said control means controlling the operation of said distribution means to distribute said data in accordance with said destination signal.

19. The system of claim 1 further including storage means for storing said data received from said input means, said data being distributed to selected recipients in accordance with said distribution signal.

20. The system of claim 19, wherein said data is stored in said storage means for a predetermined period of time before being distributed by said distribution means.

21. The system of claim 1, wherein said paging signal is transmitted over a conventional radio common carrier.

22. The system of claim 1, wherein said data is formatted to include the date and time of origin.

23. The system of claim 22, wherein said data is formatted to include a description of the subject matter of the data and its originator.

24. The system of claim 1, wherein said paging signal includes a priority signal indicating the urgency of receipt of said data.

25. The system of claim 1, wherein said data is formed of voice messages.

26. A remote signaling system, for controlling the operation of a remotely located device, said system comprising:

control signal input means for inputting a control

signal;

destination signal input means for inputting a destination signal;

radio paging signal means for transmitting said control signal to a remote destination in accordance with said destination signal; and

control means coupled to said control signal input means, said destination signal input means and said radio paging signal means.

27. The system of claim 26, wherein said control signal input means is a touch-tone telephone or full motion real time vision phone or picture phone.

28. The system of claim 26, wherein said control signal input means is a cellular telephone or cellular full motion real time cellular vision phone.

29. The system of claim 26, wherein said control signal input means is a digital computer.

30. The system of claim 26, wherein said remotely located device is a cellular telephone or cellular vision phone.

31. The system of claim 30, wherein said control signal enables the operation of said cellular telephone to receive telephone calls or full motion real time vision phone or picture phone.

32. The system of claim 31 wherein the electrical power to said cellular telephone is essentially off until said control signal is received.

33. The system of claim 26, wherein said remotely located device is a computer.

34. The system of claim 33, wherein said control signal enables the operation of said computer.

35. The system of claim 34, wherein the electrical power to said computer is essentially off until said control signal is received.

36. The system of claim 26 further includes paging signal receiving means for receiving said paging signal.

37. The system of claim 36, wherein said paging signal receiving means processes said control signal to provide a plurality of control functions.

38. The system of claim 37, wherein said plurality of control functions include functions to configure said remotely located device to a predetermined configuration.

39. The system of claim 37, wherein said plurality of control functions include functions to control the electrical power applied to said remotely located device.

FIG. 1

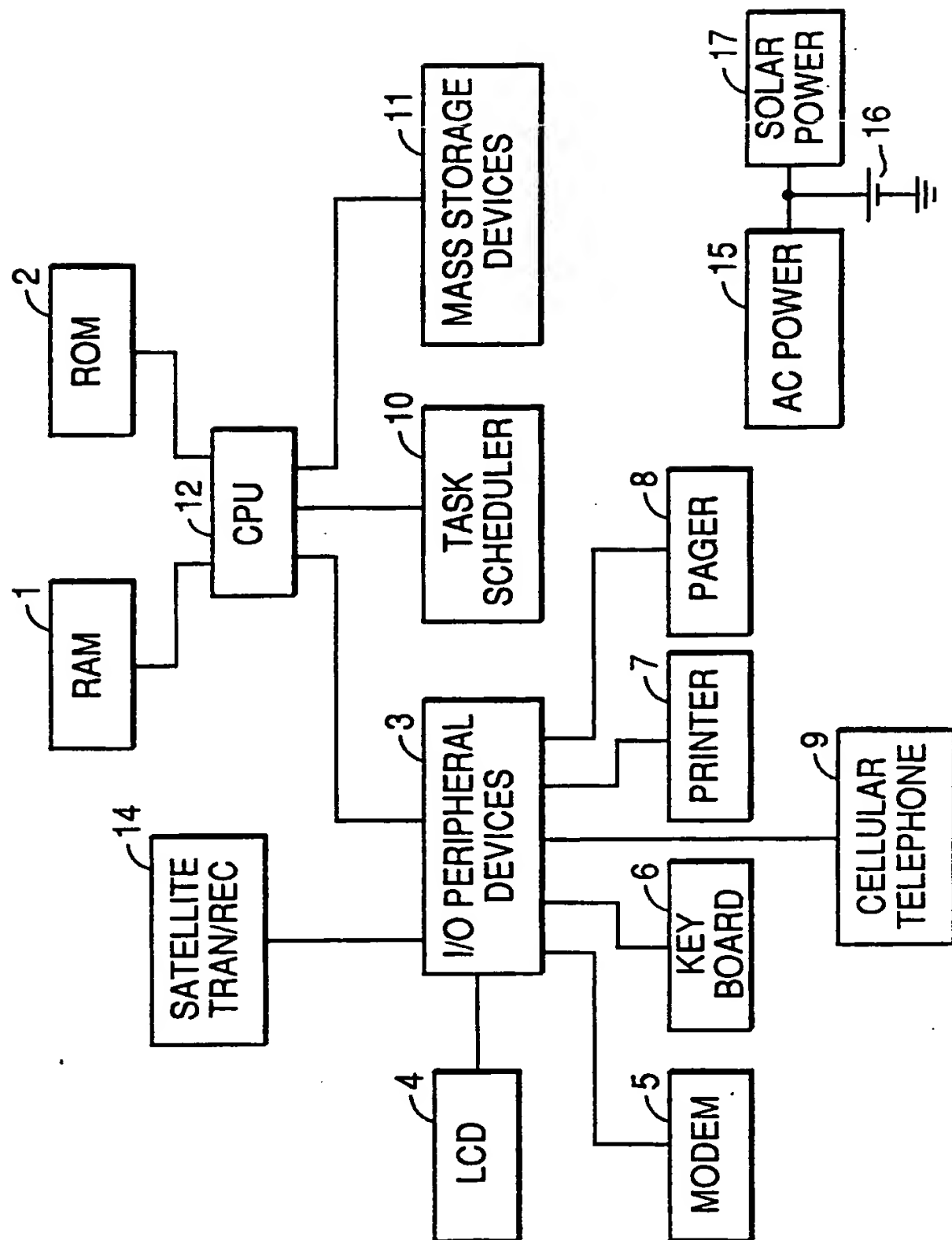
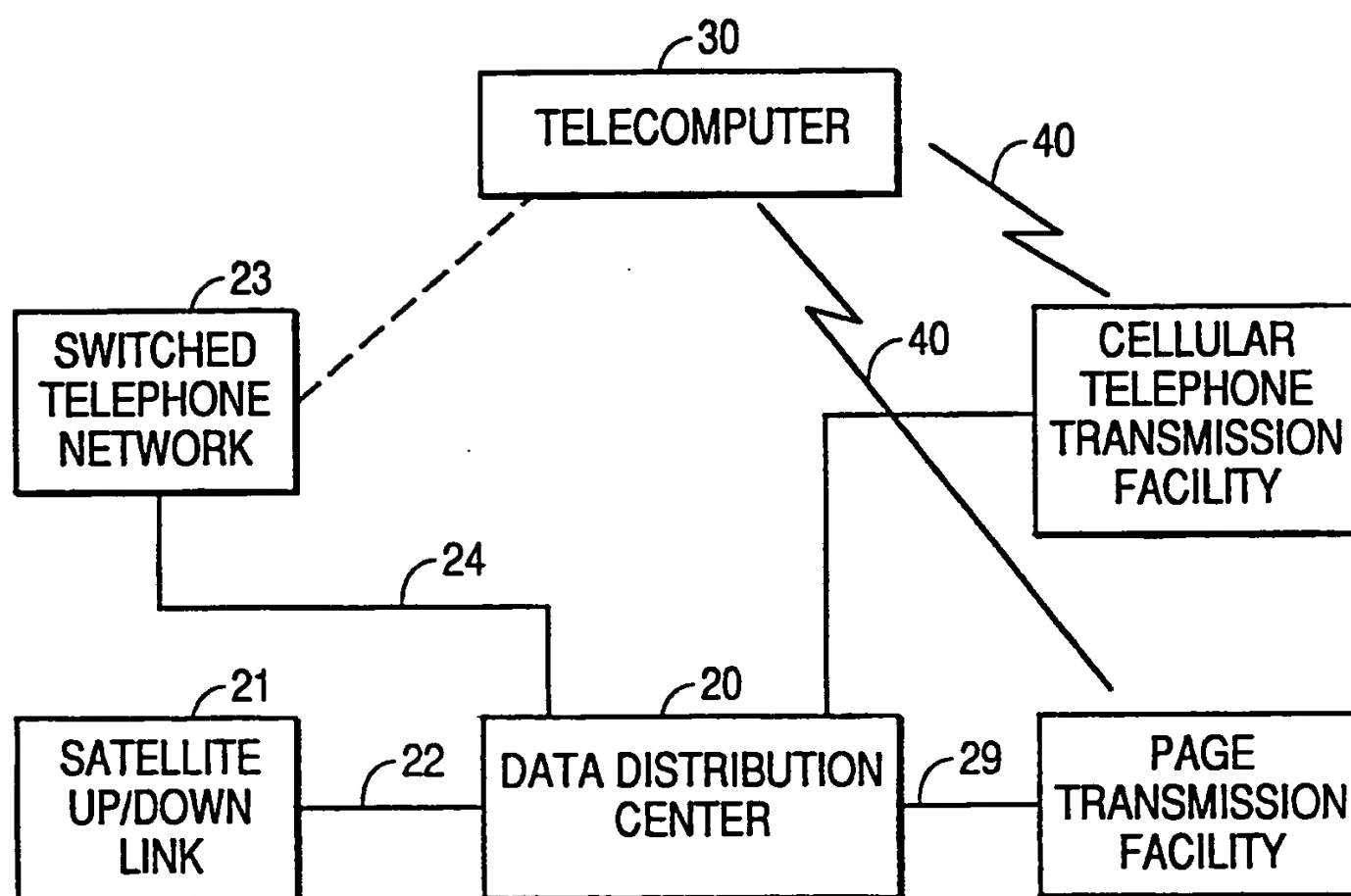


FIG. 2

INTERNATIONAL SEARCH REPORT

International application No.
PCT/US93/12417

A. CLASSIFICATION OF SUBJECT MATTER

IPC(5) :H04M 11/00, 1/00; G08b 5/22

US CL : 379/57

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

U.S. : 379/56, 57, 93, 96, 100, 102, 104, 105, 106, 107, 110; 340/825.44, 825.47

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X ----	US, A, 4,713,837 (GORDON) 15 DECEMBER 1987, col. 4, line 20-col. 7 line 36 and see Figure 1.	1, 7, 17-21, 26 -----
Y		2-6, 8-16, 22-25, 27-39
Y	US, A, 4,922,518 (GORDON ET AL) 1 MAY 1990, col. 2, line 26-col. 3, line 12 and see Figure 1.	1-39
Y	US, A, 5,144,648 (BHAGAT ET AL) 1 SEPTEMBER 1992, figures 1-2 and see col. 3, line 60-col. 6, line 48.	1-39
Y	US, A, 5,109,220 (BREEDEN ET AL) 28 APRIL 1992, col. 3, line 4-col. 6, line 48 and see Figures 1-3.	1-39

☒ Further documents are listed in the continuation of Box C. ☐ See patent family annex.

* Special categories of cited documents:	T	later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
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INTERNATIONAL SEARCH REPORT

International application No.
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C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US, A, 4,926,460 (GUTMAN ET AL) 15 MAY 1990, col. 2, line 32-col. 4, line 68 and see Figure's 1-3.	1, 26
A	US, A, 4,811,379 (GRANDFIELD) 07 March, 1989, fig.1.	1, 26